



# Triggers of consumers' enhanced digital engagement and the role of digital technologies in transforming the retail ecosystem during COVID-19 pandemic

Yangyang Jiang<sup>a</sup>, Nikolaos Stylos<sup>b,\*</sup>

<sup>a</sup> Nottingham University Business School China, University of Nottingham, Ningbo, China

<sup>b</sup> School of Management, University of Bristol, Bristol, Howard House, Queens Ave., Clifton, BS8 1SD, UK

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## ABSTRACT

This study seeks to unravel the factors that have triggered changes in individuals' engagement with online consumption during the COVID-19 crisis and investigate the influence of digital technologies on the retail ecosystem during the lockdowns, as seen through the eyes of consumers. In doing so, a qualitative empirical research approach was adopted, and data was collected via in-depth interviews with 35 respondents during the COVID-19 lockdown in China. The study has delineated a systematic mapping of the retail ecosystem's reactions to the COVID-19 shock. Three overarching dimensions related to consumers' online purchasing behaviors during the COVID-19 pandemic were identified: triggers of enhanced digital engagement, transformative capacity of digital technologies, and socio-economic adaptability during crises. The relevant themes underlying each aggregate dimension were further elaborated with evidence from the interviews. The study findings advance the extant literature on purchasing behavior and online retailing in times of crisis and offer important practical implications on improving crisis management capabilities of the retail ecosystem via digital technologies. As a final output, four propositions were extracted to serve for further research.

## 1. Introduction

In the last three decades, the technological developments of Web 2.0 and Web 3.0 have largely served as the driving forces for the Marketing 3.0 era of customization, and the digitalization age of Marketing 4.0, respectively (Erragcha & Romdhane, 2014; Shan et al., 2020). Information and communication technologies (ICTs), online marketing platforms and sophisticated digital devices have advanced exponentially, supporting the growth of various economic sectors (Zhu, 2021). Specifically, in the retail sector, various digital technologies support multichannel strategies or even an omni-channel approach, which offer consumers a range of alternatives in purchasing goods and services (Jin & Shin, 2020). Mobile devices, mobile apps, augmented reality and virtual reality applications, and various types of bots have already been in service instead of or combined with traditional human-to-human interactions – in either physical, online or hybrid offline/online settings – to serve customers' needs and retailers' goals (Hu & Tracogna, 2020; Verhoef et al., 2015).

The digital transformation of the retail sector has emerged through

the natural evolution of digital technologies' implementation, so retail organizations and individuals would facilitate their access to world markets, offering improved serviceability, and building competitive advantages (Altıntaş et al., 2020). This set of retail actors comprise a generic retail ecosystem, who interchange goods and services for money and data, contributing to economic value streams. These actors can be branch retailers, online retailers, multi-channel retailers, IT-solution providers, service providers, store equipment providers, producers, data suppliers, logistics firms, and consumers (Böttcher et al., 2021).

Online shopping is gaining great importance, and digital technologies reveal new potentials for interaction among retail actors (Frishammar et al., 2018). In fact, digitalization of retailing contributed to streamlining respective processes, thus achieving marketing effectiveness, and closing distances within a global village context, all at lower costs (Ziliani & Ieva, 2014). As researchers note (Saura et al., 2014; Soto-Acosta, 2020), the digital advancement has occurred based on retail chain stakeholders' investments on new technologies in normal times and has been accelerated during times of crises. Overall, the retail ecosystem has been undergoing major changes from a technological perspective, which started before the

\* Corresponding author.

E-mail addresses: [yangyang.jiang@nottingham.edu.cn](mailto:yangyang.jiang@nottingham.edu.cn) (Y. Jiang), [n.stylos@bristol.ac.uk](mailto:n.stylos@bristol.ac.uk) (N. Stylos).

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emergence of the COVID-19 pandemic.

Although humanity have had to confront various types of crises in the non-distant past – including financial crises, natural disasters and epidemics – it is true that none of them had challenged so fiercely people's daily routines and attained life quality as that of the COVID-19 pandemic (Beaunoyer et al., 2020). From a retail aspect, consumers' priorities, service touch points, and organizations' business processes were vastly disrupted, as social distancing imposed by most countries around the world, forced every retail stakeholder, i.e. individuals and organizations, to amend their usual ways of accessing the markets, so they would better survive the pandemic (Kabadayi et al., 2020). In this context, it has already been reported that digital technologies play an enhanced role in keeping up retail operations and providing uninterrupted customer service (e.g. Forster & Tang, 2005); these technologies may greatly facilitate retailers' efforts to improve their crisis management capabilities to the benefit of the whole retail ecosystem. Firm capabilities that are based on digital technologies may optimize businesses independently in response to changes in the external environment (Wang et al., 2020). This tendency is further propelled by consumers' engagement with online platforms and digital channels more frequently than ever before, due to their concerns about the contamination of coronavirus disease and the governmental restrictions in free movement of persons (Hazée & Van Vaerenbergh, 2020).

It should be noted that up until now, most research studies published on the impact of COVID-19 on retailing have merely presented the potential challenges retail stakeholders face during the crisis (e.g. He & Harris, 2020; Jones & Comfort, 2020; Mollenkopf et al., 2020; Pantano et al., 2020; Sheth, 2020). The existing body of empirical research has rarely investigated the impact of the public health crisis on consumers' purchasing experience during the COVID-19 pandemic, with two exceptions. Akhtar et al. (2020) examined the impact of the public health crisis on consumers' purchasing experience during the COVID-19 pandemic. Rather than online retailing, they focused on the impact of choice hesitation and confidence on offline shoppers' psychological reactance on choice freedom satisfaction. Moreover, Laato et al. (2020) assessed the role of digital technologies on retail services and consumer purchasing behavior. While these scholars examined the influence of online information sources on panic buying underpinned by the Stimulus-Organism-Response framework at the beginning of COVID-19 pandemic, their research focused only on this type of herd behavior and disregarded other aspects of decision making during the crisis; besides, this study employed a framework that does not consider the crisis management aspect in its core conceptualization. Recently, Ameen et al. (2020) investigated how the incorporation of AI in shopping can lead to an enhanced AI-enabled customer experience, based on data collected from consumers following the COVID-19 outbreak. Notwithstanding the service location convenience factor was extensively discussed in a post-COVID-19 context, Ameen and her colleagues did not focus on the impact of COVID-19 pandemic on retailing per se (Ameen et al., 2020). Furthermore, the aforementioned studies may have missed important consumer purchasing behavioral patterns at both individual and collective levels (e.g., degree of consumers' engagement with online purchasing, any key product attributes receiving additional attention by consumers because of the COVID-19 outbreak, any new community purchasing initiatives) during the COVID-19 crisis, which is an unprecedented ongoing event of exceptional circumstances for people around the globe.

Besides, most published empirical research related to health crises mainly examined the effects of Severe Acute Respiratory Syndrome (SARS) and Middle East Respiratory Syndrome (MERS) on offline and online retailing (e.g. Forster & Tang, 2005; Jung & Sung, 2017). These have provided useful insights into consumers' engagement with online shopping, the relative weightage of the offline and online shopping channels in actual sales, and the distinct effects of epidemics on various categories of retail goods. However, the societal and financial impacts of those past epidemics (i.e. SARS and MERS) were smaller, and limited to

certain geographical regions (Brem et al., 2021), as compared to the widespread consequences of the COVID-19 pandemic in terms of the impact on public health, the scale of exceptional measures taken worldwide to mitigate the spread of the pandemic (including extensive national or regional lockdowns), and the magnitude of the emerging financial crisis in the retail industry (Zwanka & Buff, 2020). This situation has required retail ecosystem stakeholders to review their practices and act accordingly.

Considering the unprecedented circumstances of the novel coronavirus pandemic, this study seeks to unravel the factors that have triggered changes in individuals' engagement with online consumption during the COVID-19 crisis and investigate the influence of digital technologies on the retail ecosystem during the lockdowns, as seen through the eyes of consumers. We particularly explore buyers' perceptions of their purchasing experiences and the role of digital devices, online apps, and retail platforms in augmenting offline and online purchasing during the COVID-19 pandemic. In doing so, a qualitative research approach has been taken, carrying out an abductive investigation. This exploration was conducted during the COVID-19 lockdown in China, and the collected data were interpreted from a hypothetical overarching technological conceptualization, by working inductively to obtain new insights.

The present study addresses two research questions: First, what are the changes in the consumer's online and offline purchasing behavior during the COVID-19 lockdowns? Answering this question echoes the relevant research call of Acquila-Natale & Iglesias-Pradas (2021) on consumer behavior in multichannel contexts. Second, how do consumers and retail service providers adapt to the unprecedented situation caused by COVID-19 lockdowns with the assistance of digital technologies? By responding to this query, the current research responds to Kabadayi's et al (2020) research questions on how consumers appreciate the adoption of digital applications and, how they anticipate retail organizations to respond to the consequences of the ongoing pandemic.

Overall, responding to these research questions would contribute to further understanding of shoppers' online and offline behavior during severe public health crises. Furthermore, useful comparisons could be made with the respective outputs from studies on SARS and MERS epidemics to better understand potential similarities and differences with the COVID-19 one. From a theoretical viewpoint, this study contributes to unraveling consumers' attitudes, expectations and purchasing patterns emerging from the first pandemic of this magnitude in the last 100 years, through the lens of the latest technological evolutions in ICTs and digital devices. It offers a structured way of theorizing transformational capacity and adaptability of digital technologies in the e-tailing ecosystem within the challenging contemporary retail environment. Practically, it offers important insights into the ways retail organizations can systemize the use of digital technologies in new business models, to further improve their crisis management capabilities, and better respond to future retail mega-disruptions in turbulent times.

## 2. Theoretical Background

### 2.1. Consumer behavior during crises and the role of digitalization

Unexpected and disruptive events, such as epidemics, hurricanes, and earthquakes, are associated with severe consequences to the physical safety and mental health of individuals, as well as lead to high levels of stress and pain (Delorme et al., 2004). These disasters may turn to crises, thus possibly affecting people's usual ways and quality of living, and also causing consumers to alter their purchasing behaviors while trying to minimize the devastating effects of the crises on their lives (Ballantine et al., 2014; Forster and Tang, 2005; Sneath et al., 2009). For instance, according to a McKinsey report, department store basket sizes were 54 percent smaller during the COVID-19 epidemic crisis in China. This may be because of consumers' reluctance to queue in crowded environments (McKinsey, 2021).

The effects of financial and natural disaster crises upon consumer behavior have been widely explored in the extant literature and have revealed changes in consumers' psychology and purchasing patterns (e.g. Ang et al., 2000; Sneath et al., 2009). Also, confronted with external environment challenges and lack of resources, consumers engage in purchasing behaviors that may lead to recovering losses, ensuring personal safety, find comfort, managing emotional states, regaining a sense of normalcy, and reestablishing their sense of self (e.g. Kennett-Hensel et al., 2012). Depending on the product categories, these behaviors include impulsive and compulsive purchasing patterns, which are merely emotion-based and reactive to achieve short-term benefits, although this could result in long-term repercussions for both the individual and the collective interest of the community (Islam et al., 2021; Sneath et al., 2009). Additionally, businesses tend to adopt adaptive marketing strategies to respond reliably to consumers' purchasing needs by trying to avoid disruptions to supply chains, and if appropriate, to implement expansive business strategies to strengthen their market positioning, while the demand on certain categories of goods rise suddenly in periods of crises (Ang et al., 2000).

Nowadays, digital technologies permeate every aspect of people's lives. The development of ICTs has drastically altered the way people deliver, receive, and exchange information. This has been the case not only in normal times but also in turbulent ones, as ICTs have proved essential for the public to obtain up-to-date information while dealing with various types of crises (Loukis et al., 2021; Park et al., 2019; Zhu, 2021), including natural disasters, social unrests, terrorism, and public health crises (Effenberger et al., 2020). The key breakthrough with digitalization occurred with the COVID-19 crisis during which ICTs served as catalysts for a more intense and widespread implementation of digital applications and online interactions across various economic sectors, particularly in the regions experiencing lockdowns (Pandey and Pal, 2020).

Recently, the COVID-19 lockdowns forced individuals around the globe to rely more on technology for living, working, educational, leisure, and social interaction purposes (Magsamen-Conrad & Dillon, 2020). In this respect, Beaunoyer et al. (2020) argued that digital inequalities could be mitigated during the COVID-19 crisis, thus increasing digital literacy, online communications, and access to social support via online platforms, including direct provision of critical health-related information to the public (Abd-Alrazaq et al., 2020). Moreover, Zhong et al. (2020)'s investigation on the usage of social media during Wuhan's COVID-19 outbreak found that informational, emotional, and peer support increased as a result of people's widespread engagement with social media platforms.

## 2.2. Online shopping during epidemics

Digital technology offers a wide range of options, including social media platforms, autonomous devices/agents (robotics), mobile applications and wearables, crypto-currencies and Block chain (Buhalis et al., 2019). There is extensive empirical research demonstrating that consumers have become increasingly technology-dependent in every facet of their lives (e.g. Priporas et al., 2017). Furthermore, organizations make use of suitable technological solutions to enhance the serviceability of their offline or online service scapes, across different economic sectors (Ballantyne & Nilsson, 2017), and under distinct – or even challenging – circumstances, including times of crises (Willems et al., 2021). This trend applies to public health crises as well, as individuals may utilize various digital communication platforms in their effort to react and overcome the challenges they face (Effenberger et al., 2020). For example, according to the National Bureau of Statistics of China, national online retail sales hit 11.76 trillion yuan in 2020, up 10.9 percent from the previous year. Among them, online retail sales of goods totaled 975.9 billion yuan, a 14.8 percent increase over the previous year (Meijing, 2021). The importance of digital technologies in epidemic crises has already been acknowledged, including the 2003 SARS and

2015 MERS ones (Choi et al., 2017; Devezas, 2020). Published studies implementing various theoretical frameworks (e.g. media system dependency theory) supported that the influx of online information did not only change the existing way of information exchange through mass media, but also started transforming consumer purchasing by challenging the traditional relations in the producers-intermediaries-consumers chain (e.g. Tai & Sun, 2007).

Notwithstanding the severe nature of epidemic crises for humans, their effects on consumer behavior have only been occasionally explored, with few studies referring to the overall economic cycle (e.g. Wanjala, 2020), or mainly focusing on the physical consumption of goods and services (e.g. Akhtar et al., 2020; Hall et al., 2020). Various theoretical frameworks have been utilized in this context, including the computable general equilibrium (CGE) model, and the resources-challenges equilibrium (RCE) framework, which strive to delineate the wider impact of epidemic crises at sectorial level (Yang & Chen, 2009), or throughout a business ecosystem (Finsterwalder & Kuppelwieser, 2020), respectively. Interestingly, Akhtar et al. (2020) investigated consumers' psychological reactions to restrictions imposed during the COVID-19 pandemic, through the lens of psychological reactance theory, though concentrating on offline shopping only.

In fact, the published body of research on epidemic crises as seen through the lens of the recent advancements of digital technologies is even scarcer (Addo et al., 2020). Surprisingly, existing research in the area of online consumer behavior fails to shed much light on the influence of epidemic crises upon the online purchasing behavior and e-tailing, although few notable exceptions exist (e.g. Jung & Sung, 2017; Zwanka & Buff, 2020). For example, Forster and Tang (2005)'s research demonstrated how online consumer demand in fast-moving consumer goods (FMCG) rose rapidly when infections grew quickly and then slowed down when infections tapered off. This trend was attributed to a change in the consumer demand to the fear of catching the infection. In addition, they pointed out that online shopping provided consumers with an alternate channel to obtain products normally purchased in traditional offline markets, such as seafood and vegetables, and concluded that online shopping increased individuals' confidence to get through the crisis. Also, Zwanka and Buff (2020) conceptualized the impact of the COVID-19 pandemic on consumer behavior compared to previous crises, considering the influence of digital applications. These scholars proposed that experiencing and hedonism, working online, virtual reality, focus on environment, and online purchasing have gained additional momentum, due to the wide availability and individuals' engagement with advanced digital applications. These aspects will exert long-lasting effects on contemporary retailing, thus influencing individuals' purchasing patterns and shaping the post-COVID-19 retail sector (Brem et al., 2021; Soto-Acosta, 2020). Albeit very insightful, previous studies have not focused on how individuals' purchasing behavior has been gradually changing as a result of the epidemic crises in their daily routines by means of the transformative powers of digital technologies.

## 2.3. Crisis management in retailing during epidemics

Epidemic crises, such as the COVID-19 outbreak which turned to a pandemic, may cause unpredictable and significant threats to the stability and continuity of retail businesses, thus directly affecting their capabilities to provide products and services to consumers (Tse et al., 2006). Many governments around the world required most shops to remain closed for months while facing the COVID-19 emergency in Spring 2020, thus causing a major disruption to the operation of physical stores (e.g. Lazzarini & Putoto, 2020).

When dealing with a crisis, organizations face great pressure to make decisions rapidly and react quickly to minimize the damage having available limited intelligence. Scholars in crisis management assert that timely reaction is especially important in addressing the crisis. Tse et al. (2006) examined how restaurants in Hong Kong responded to the 2003

SARS outbreak and found that local restaurants dealt with this unprecedented crisis through a combination of cost reduction and revenue enhancement strategies. In addition, they proactively took steps to sanitize the restaurant area and used cleanliness and hygiene as a selling point in addition to food quality and cost. Upon analyzing the data of online shopping during the SARS crisis in Hong Kong, Forster and Tang (2005) asserted that online shopping provided an effective channel for retailers to distribute products for infection prevention, such as disinfectant hand soaps and bleach products.

Hagberg et al. (2016) argued that the incorporation of digital technologies in retailing may result in the transformation of previously existing practices, procedures, actors, and goods. Furthermore, Willems et al. (2021) projected that the COVID-19 pandemic and containment regulations will stimulate the accelerated adoption of technological advancements in retailing, while digital technologies could facilitate consumer experience management in the post-pandemic 'new normal'. These researchers called for more studies to provide evidence about the digitalization of retailing, especially how it enables retailers to overcome challenges posed by crises and develop advanced crisis management capabilities with the use of new technologies.

After presenting the background on e-tailing and online consumer behavior during crises, which form the context of the study, we now outline the theoretical foundations for this empirical research.

#### 2.4. Theoretical framework foundations

The previous subsections indicate that unexpected, disruptive, and even life-threatening events lead to crises that may severely change the ways consumers behave. It is also widely acknowledged that digital technologies play a decisive and transformational role in contemporary retailing, as both individuals and organizations tend to make extensive use of them to setup and enhance their access to various online market channels. Still, the specific set and structure of factors that can underpin a dynamic digital retail environment during a period of an epidemic crisis need to be clarified.

The literature suggests that the socioeconomic structures are highly dependent on the respective technological attributes characteristics of a socio-technical system (Dolata, 2009; 2013). Thus, technology-based transformations may occur in various ways, depending on the socio-technical reality of specific economic sectors, as shaped by the respective stakeholders and the external environmental forces or selection pressures for change (Dolata, 2013; Schubert et al., 2013). As Smith et al. (2005) posited, socio-technical transformations result from the combination of two processes, i.e., a) shifting selection pressures on the current status of a socio-technical system, and b) the coordination of internal and external system resources to adapt to these pressures.

In line with this, two important aspects accompany the abundant availability of new technologies, which can explain the distinct patterns of technology-based operations and drive change in a particular sector (Dolata, 2009): transformative capacity, and sectoral adaptability. The transformative capacity of digital technologies facilitates the identification of technology-based pressure to change the structural arrangements of a given ecosystem. The sectoral adaptability determines the distinct social patterns of anticipation and absorption of this technology-based pressure. The interaction between these two influencing factors may create advanced organizational, structural, and institutional transformations (Augenstein, 2015).

Considering these influencing factors as the starting point for this research, we posit that these are rather useful to the retail sector, especially in highly turbulent periods of major crises as: a) the transformational nature of digital technologies goes beyond serving as an auxiliary mechanism, and rather is dominant and oftentimes disruptive to traditional physical retailing; and b) the adaptability of retail stakeholders, be it individuals or organizations of various roles (i.e. producers, intermediaries, consumers), to operate through digital structures, is crucial for managing digital technologies and the overall

dynamics of technology-based transformations. Thus, in light of the dramatic changes an epidemic crisis may bring, the transformative capacity and adaptability of ICT technologies to organizational structures, can provide together a full aspect of new developments in the retail service chain; and this can demonstrate the integration of digitalization into retailing, from identifying opportunities to modify existing retail systems (e.g. ordering/fulfilling orders to delivering products) up to discovering various modes of absorption of digital applications by retail organizations, respectively.

The influencing factors of technology-based sectoral change mentioned above (Dolata, 2009) need to be further operationalized in the retail ecosystem via a second theoretical conceptualization that would create direct links among the various retail stakeholders. Furthermore, Dolata (2009) proposed three components of sectoral adaptability including socioeconomic structures, institutions, and actors in the face of new technological opportunities. In line with this, Hagberg et al. (2016) established a model of four generic retail system components, i.e. actors, exchanges, offerings and settings. Utilizing this set of components in our conceptualization and for building our qualitative field research instrument would be useful in revealing mutual relationships between different elements of ICT technologies and various retail ecosystem stakeholders. Besides, this set of retail system components offers a structured way to examine their inter-dependence and their potential transitions over different times or periods of crises. Thus, it can further delineate the current and future transformations of retailing resulting from the digitalization of retail operations.

Overall, the frameworks offered by Dolata (2009) and Hagberg et al. (2016) combinedly serve as the bedrock for our theoretical development, which would be further informed by our empirical field research findings, according to the abductive investigative approach undertaken.

### 3. Materials and Methods

#### 3.1. Research approach and procedure

The exploratory nature of the current study has directed toward a qualitative research approach to be taken. Thus, authors have designed and conducted a field research study aiming to unveil insights into the impact of digital technologies on retail consumption trends, emphasizing online purchasing during an epidemic crisis. An abductive investigative approach was followed, and collected data were interpreted from a hypothetical overarching pattern. The abductive approach is particularly useful for developing theoretical models creatively, as it enables a systematic matching of theoretical and empirical resources on a continuous back and forth interaction between theory and data, thus seeking an in-depth understanding of a research topic (Reichert, 2007). In practice, this is pursued via a hybrid thematic analysis, with some of the codes been pre-known as part of the study's research questions, whereas other codes emerged from the interviews' content (Dubois & Gadde, 2002).

From this perspective, selected theoretical frameworks are combined with data emerging from empirical work to evolve in a concurrent research development manner. Thus, combining the framework of digitalization in the retail-consumer interface (Hagberg et al., 2016) with the concepts of transformative capacity and sectoral adaptability of new technologies (Dolata, 2009), was deemed as the best approach to reflect the selected study context. We worked inductively, to obtain new insights through coding of collected data, before again revisiting the relevant body of literature to establish the themes and contextualize the findings.

This study, therefore, has moved through different stages focusing both on theory and on empirical evidence, with the data collection occurring via a series of in-depth interviews with consumers (Charmaz & Belgrave, 2012). The whole research procedure has ultimately led to the development of some propositions, resulting from the combination of theory and data.

### 3.2. Sampling considerations, interview guide, and data collection

To recruit a suitable group of field respondents, purposive sampling via an online platform was applied with a focus on consumers living in Chinese metropolitan areas impacted by the COVID-19 crisis, as shown on Table 1. Since consumers tend to purchase products both online and offline in the COVID-19 period (Pantano et al., 2020), the respondents were selected to have some experience with both offline and online purchasing. This is regarded as the most appropriate sampling approach given the project objectives, the required type of data to be collected, and the challenges in collecting data during critical events (Ibrahim & Wang, 2019).

To attain a sufficient sample size, the researchers have run the data collection process to the point that theoretical saturation would be safely reached (Francis et al., 2010). Hence, the final sample size was formed based on data saturation, which began from a projected sample of 25 interviews, and applying an additional a-priori stopping criterion of three interviews (Sim et al., 2018). Consequently, these two criteria together determined the final number of interviews to thirty-five, as the last three interviews (i.e. No.33, 34 and 35) did not contribute to any extra primary categories of raw content and subsequent themes.

An in-depth interview guide (see Appendix A) was developed based on published literature (i.e. Ang et al., 2000; Baytiyeh, 2018; Kennet-Hensel et al., 2012; Priporas et al., 2017) to serve as measurement instrument for this study. It was pre-tested for readability, and content relevance to the research questions and objectives of the current study. Accordingly, a set of eleven open-ended questions comprises the interview guide to collect consumers' responses with respect to the role digital platforms play in shaping purchasing patterns, in light of the COVID-19 pandemic. The interview guide consists of two warm-up questions about the ongoing coronavirus crisis, and the main part consists of two groups of ten questions in total. The first group of questions covers the influence of digital technologies on consumers' purchasing behaviors during the epidemic crisis. The second part of the main group of questions seeks to record any current changes in consumers' purchasing behaviors and new trends being introduced in the retail ecosystem, which may extend to the future following the nation-wide or/and local lockdowns. A consent form was given to the interviewees before the interview started, and their confidentiality was guaranteed with the use of pseudonyms/labels.

### 3.3. Data collection

The interview respondents were first approached via social media to explain the purpose of the current research, informing them about the topic, purpose and relevant conditions of conducting an online discussion, and then dates, times, media were proposed for doing so. They were then invited to participate in one-to-one online interviews. Subsequently, an online WeChat meeting took place with the individuals who responded positively to the invitation. All interviews were conducted online in Chinese between February 15<sup>th</sup> and March 15<sup>th</sup>, 2020 and lasted between 45 min and one hour each on average. All interviews were recorded, transcribed, and then translated into English. The back-translation procedure was performed to ensure that the translated version accurately reflects the meaning of the original source content.

Male respondents comprise 46 percent of the sample, whereas 54 percent are females. Most interviewees are full-time employees in the COVID-19 affected areas in China, and most of them have high educational backgrounds. The study yielded 35 transcribed interviews originating from 13 cities (from across Tier 1, Tier 2, and Tier 3 cities in

**Table 1**  
Demographic information of respondents.

No.	Gender	DOB	Level of studies	City	Employment
1	Female	1990	Post-graduate studies	Beijing	Full-time employee
2	Female	1980	University/College	Beijing	Free-lance professional
3	Female	1990	Technical school	Shanghai	Full-time employee
4	Female	1982	University/College	Shanghai	Full-time employee
5	Female	1986	Post-graduate studies	Nantong	Free-lance professional
6	Male	1991	University/College	Shanghai	Full-time employee
7	Female	1986	Technical school	Beijing	Full-time employee
8	Female	1987	Post-graduate studies	Beijing	Full-time employee
9	Male	1986	Technical school	Beijing	Full-time employee
10	Male	1986	Post-graduate studies	Beijing	Full-time employee
11	Female	1985	University/College	Nanjing	Full-time employee
12	Male	1990	Post-graduate studies	Hangzhou	Full-time employee
13	Female	1970	University/College	Shanghai	Household keeping
14	Female	1987	Post-graduate studies	Beijing	Full-time employee
15	Female	1997	University/College	Guiyang	Full-time employee
16	Female	1996	Post-graduate studies	Ningbo	Full-time employee
17	Female	1979	University/College	Beijing	Free-lance professional
18	Male	1983	University/College	Beijing	Full-time employee
19	Female	1979	University/College	Beijing	Full-time employee
20	Male	1986	Post-graduate studies	Qingdao	Full-time employee
21	Male	1987	Post-graduate studies	Beijing	Full-time employee
22	Female	1990	Post-graduate studies	Changsha	Full-time employee
23	Male	1990	Post-graduate studies	Beijing	Full-time employee
24	Female	1996	Post-graduate studies	Ningbo	Unemployed
25	Male	1963	University/College	Shenzhen	Entrepreneur/Businessperson
26	Male	1989	University/College	Tianjin	Full-time employee
27	Female	1994	Post-graduate studies	Ningbo	Unemployed
28	Male	1996	Post-graduate studies	Ningbo	Full-time employee
29	Female	1987	Post-graduate studies	Shanghai	Full-time employee
30	Male	1985	Post-graduate studies	Xinxiang	Full-time employee
31	Male	1990	University/College	Ningbo	Full-time employee
32	Male	1986	Technical school	Ningbo	Full-time employee
33	Female	1977	University/College	Hangzhou	Full-time employee
34	Male	1997	University/College	Ningbo	Full-time employee
35	Male	1976	University/College	Bengbu	Full-time employee



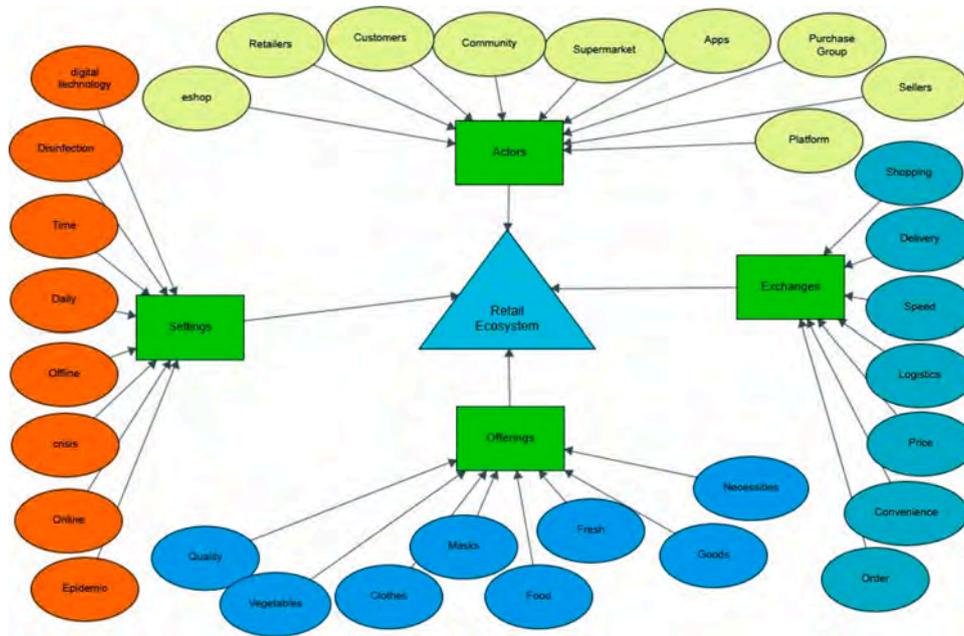


Fig. 2. NVivo concept map.

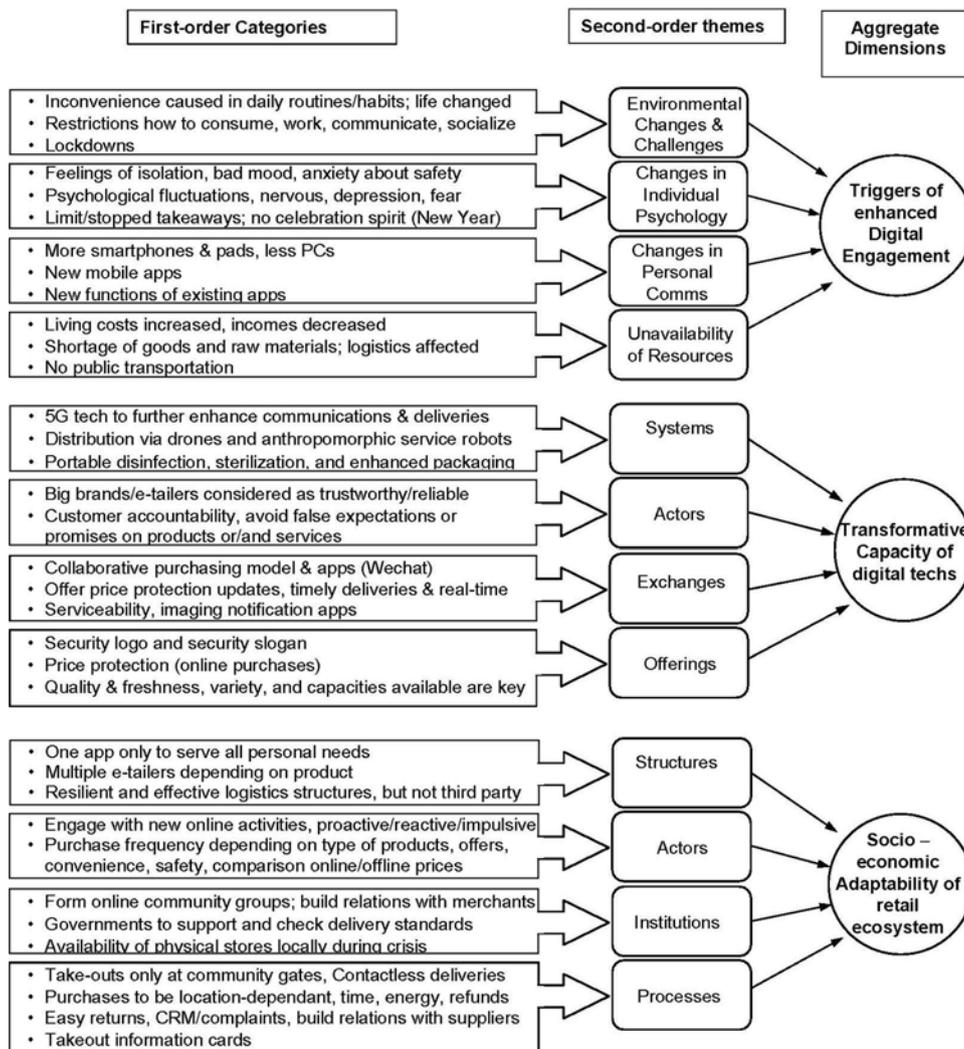


Fig. 3. Final data structure for the inductively generated dimensions.

usage of the Internet for work and entertainment purposes:

*"I use WeChat to get in touch with friends more frequently. I use Dingding and ZOOM for online meetings and use live streaming applications and online video websites to kill time."* (Interviewee 5);

*"Work is conducted at home, so there is no need to go to the company premises. We arrange the work through the WeChat group every day."* (Interviewee 35).

It is also noteworthy that quite a few participants have increased Internet usage to acquire detailed and real-time information about the public health crisis, for example:

*"I obtain the information about the epidemic mainly from the online platforms. I pay attention to news on Tencent News, Weibo and Jinri Toutiao every day."* (Interviewee 13);

Four themes of enhanced digital engagement have emerged from the data analysis: environmental changes and challenges, changes in individual psychology, changes in communication channels, and unavailability of resources.

#### 4.1.1. Environmental changes and challenges

An apparent underlying cause for the enhanced digital engagement is the inconvenience in daily routines and habits, such as *"the inconvenience of commuting"* (Interviewee 1) and the inconvenience of shopping resulting from wide lockdowns and subsequent disruptions caused at physical organization premises:

*"It is not convenient to go out, which makes it inconvenient for me to buy things."* (Interviewee 34);

*"The normal rhythm of life has been disrupted. The routines of work, sports, children and shopping have been broken."* (Interviewee 4).

The second subtheme that emerged as a challenge is the restrictions imposed in terms of working, communicating, consuming, and socializing. Due to concerns about safety, respondents had to *"work from home"* and *"telecommute"* (Interviewee 7). Since face-to-face *"social activities were reduced"* (Interviewee 32) and *"Parties are cancelled"* (Interviewee 10), respondents had to find alternatives for socializing by relying on digital communications.

Digital technology applications have enabled respondents to meet the challenges, regain a sense of convenience and confidence, and build a new norm of life in the crisis. As summarized by one respondent:

*"The pandemic impact on my life would have been much greater if it had occurred 10 years ago when ICTs were not as well developed as today."* (Interviewee 30).

Specifically, several respondents pointed out that, because many brick-and-mortar stores were closed at the height of the pandemic, they had to purchase products online. Respondents also noted that:

*"The convenience of online shopping and delivery is great. I can avoid big crowds that I normally come across when going to the supermarket."* (Interviewee 7).

#### 4.1.2. Changes in individuals' psychology

The COVID-19 related fear, depression, and anxiety were frequently noted among the respondents. Eighty percent of the respondents mentioned feelings of isolation, bad mood, and fear and anxiety about safety:

*"I do not dare to go out."* (Interviewee 1);

*"Seeing online information that more and more patients have been diagnosed with the coronavirus, I am down in spirits."* (Interviewee 15).

In addition, many respondents talked about their psychological

fluctuations involving depression and tension:

*"I feel depressed. The negative news causes psychological fluctuations"* (Interviewee 11);

*"The psychological fluctuation is big and even suffocating. Because of the tension created by the media, my mood is severely affected."* (Interviewee 25).

Some respondents also expressed their worry over personal health. For example:

*"Because I can't go out and walk around, I lack exercise and have gained weight."* (Interviewee 25).

Furthermore, people had no celebration spirit of the most important festival in the Chinese culture, the Chinese Spring Festival, as the COVID-19 outbreak coincided with this festive season:

*"The biggest impact is that the atmosphere has changed. People are very nervous, there is no atmosphere to celebrate the Spring Festival."* (Interviewee 13).

To some extent, the digital channel provided a way to tackle the psychological discomfort and anxiety:

*"ICTs enables me to learn about the pandemic in real time. When you learn more information, you feel more confident. Whereas knowing little or nothing makes you feel worried."* (Interviewee 31).

#### 4.1.3. Changes in personal communications

Approximately ninety-one percent of the respondents highlighted their growing reliance on mobile devices such as smartphones and tablets for personal communications. Conversely, they used PCs less often. First, as mobile devices are more personal and portable, they are more frequently used than PCs in personal communications:

*"I am more dependent on mobile phones."* (Interviewee 18);

*"When using the computer, I must seriously sit there. But I can use smartphones and tablets anywhere I go."* (Interviewee 22).

Second, mobile devices have built-in payment systems and incorporate mobile-based payment services, which could help consumers complete transactions in a contactless manner and reduce the chance of touching surfaces contaminated with coronavirus. As noted in one instance:

*"Because the virus is contagious, I am afraid that cash may spread the virus. So, I use Alipay and other electronic means to pay for bills."* (Interviewee 35).

Third, mobile applications are designed to be user friendly and provide ease of use. The enhanced user experience of mobile applications is favored by respondents:

*"I rarely use my PC during the pandemic. When I access a website for news on my PC, the website is full of advertisements, which is annoying. But the app's interface is clean."* (Interviewee 25).

Furthermore, new mobile applications or new functions of existing mobile applications have met consumers' needs in the public-health crisis and encouraged them to engage in more digital activities. Several participants referred to this:

*"Mobile apps such as Baidu Map can update the location of confirmed cases in real time"* (Interviewee 7);

*"WeChat has a new Mini Program to find out how the pandemic spreads. It is convenient for me to know which places are dangerous and avoid going to these places when I am allowed to go out"* (Interviewee 15).

#### 4.1.4. Unavailability of resources

Approximately sixty-three percent of the respondents noted that, the sudden outbreak of the pandemic increased their living costs while decreasing their incomes:

*"I was using the subway before. As I do not dare to use public transport these days, I only take a taxi. This has increased my transportation costs."* (Interviewee 1);

*"This situation has severely affected my personal finances and income generation ability!"* (Interviewee 15)

In addition, respondents were confronted with shortage of goods and raw materials in physical channels:

*"Many things are sold out in the supermarkets; some products can still be found online."* (Interviewee 28);

*"The variety of vegetables is reduced. But the prices of fruit and vegetables go up."* (Interviewee 16);

*"Protective products such as masks and disinfectant products are not easy to buy."* (Interviewee 17).

#### 4.2. Transformative capacity of digital technologies

Digital agents, such as e-commerce platforms and digital logistics, can exert a direct, incisive, and generally disruptive pressure to change on the overall functionality of existing retailers, their technological structures, and serviceability (Dolata, 2009). The transformative capacity of digital technologies provides retailers with new digital opportunities, tools, and applications to adapt to the rapidly changing environment in terms of systems, actors, exchanges, and offerings.

##### 4.2.1. Systems

Overall, ICTs and Industry 4.0 applications exert pressures to change the structural and institutional architectures of retailers. For instance, the fifth generation of wireless technology, featured by increased speed, reliability, and low latency, is anticipated to further enhance communications with consumers and make delivery of products more efficient. Also, the application and upgrading of advanced technologies such as automated delivery robots and drone deliveries during the pandemic accelerate the penetration of artificial intelligence (AI) into the civil logistics industry. As summarized by two respondents:

*"The development of digital technologies, for example, 5G technology and the innovation of supply chain such as drone distribution, will definitely accelerate the development of online retailing."* (Interviewee 28);

*"JD.com offers robot delivery. This is very impressive."* (Interviewee 31).

During the pandemic period, consumers pay a lot of attention to product hygiene and personal safety when receiving deliveries, thus, a number of e-tailers have established systems and practices of antivirus measures such as disinfection technologies and enhanced product packaging. The following excerpts are representative:

*"E-tailers on JD.com and Taobao.com use a banner to indicate that the products have passed disinfection and safety inspection. We can also see this kind of safety banner in the product details section of the online store."* (Interviewee 16);

*"During the pandemic, each product item purchased from RT Mart.com has been packed separately and wrapped in a plastic wrap to prevent them from coming in contact with the air. The couriers wear protective clothing and spray disinfectant to sterilize the goods before they would deliver to me."* (Interviewee 33).

##### 4.2.2. Actors

The established actors in the retail sector that promote and facilitate technological innovations are forced to renew themselves if they want to exploit their future commercial potential (Dolata, 2009). Meanwhile, service agility and transformation are vital as service organizations should adapt flexibly to the special circumstances imposed by the disruptive challenges (Kuppelwieser & Finsterwalder, 2016). In this process, big brands and market-dominating e-tailers tend to be considered by consumers as more trustworthy and reliable:

*"I usually buy things from the online store run by JD.com, even if the price may be higher, because I believe in the brand of JD.com"* (Interviewee 7);

*"When I buy masks online, I choose famous brands. Because it is hard for me to know whether they are real or fake, I choose not to buy them from individual sellers through other online platforms, but rather use Tmall."* (Interviewee 18).

Technology-based changes triggered by digital agents should be supported by accountability in customer service. This signifies the retailer's ability to fulfil their responsibilities and promises to customers and show customers they really care about them (Sison, 2009). False promises made by some retailers on products and service deliveries could result to disappointing buying experiences and weakening of the brand's credibility. The following excerpts are representative:

*"Some online stores do not explicitly indicate that they are not able to deliver the goods. They only say that they will arrange delivery of orders soon. After placing an order online, although I waited for many days, the seller did not deliver the goods. I asked the seller and was told that the delay was because of the pandemic, and the seller said to deliver the goods asap. Then I waited for more days, but still the seller did not send the product. I feel deceived."* (Interviewee 21);

*"A campaign launched by a famous e-commerce platform to help farmers sell agricultural products during the pandemic allowed me to purchase from the place of origin directly. However, I found that the fruits I received were rotten and the overall quality was poor. It left me a bad impression and I will not buy products via this channel in future."* (Interviewee 21).

On the other hand, success stories were also reported with respect to reliable services provided by e-retailers, for example:

*"The online store informs me in advance when the fruit I ordered will be delivered. Cherries, for example, may not be as big as advertised because they are in short supply. The online merchant explained to me the actual situation of cherries and asked whether I still wanted to buy them or could wait for a while."* (Interviewee 35).

##### 4.2.3. Exchanges

In terms of exchanges, digital platforms have allowed the new community group-purchasing model to shape and develop. Different from e-commerce based on virtual networks, which originate completely from virtual communities comprised of Web users, the community group purchasing model is social commerce based on physical social networks. Specifically, residents who live in the same residential community interact with each other online and form one or more purchasing groups using mobile apps such as WeChat. This model involves transactions by community residents, which can be B2C (local stores to community residents) and C2C (community residents to other residents). It is a new business trend emerging in China as part of Web 3.0. For example, two respondents reported similar purchasing experiences:

*"I buy vegetables via the WeChat group formed by the local community where I live in. Some residents in the same community have contact with local farmers, who arrange the logistics."* (Interviewee 20);

*"The residents of our community have formed a WeChat group. The seller is a nearby grocery store. We place the order by telling the seller what we*

need in the group chat. Then we pay the bill via WeChat Pay. Products can be delivered to me within 2 hours.” (Interviewee 26).

In addition, digital technologies can have subsidiary, and functionally supportive effects on the established institutions of the retailing sector (Dolata, 2009). In this case, retailers offer price protection, timely deliveries, and real-time information updates in online transactions through ICTs. This is evident in the following comments:

“Product prices at JD.com are sometimes lower than those in brick-and-mortar stores. Besides, JD.com offers price protection. This means, if the price falls within 7 days after I make a purchase, they will compensate me with the price difference.” (Interviewee 26);

“The delivery of Hemaxiansheng [launched by Alibaba Group in 2015 as an O2O fresh food platform] is fast. And its online platform provides updated information about when the products can be delivered. I can see the real-time information using the mobile app of Hemaxiansheng.” (Interviewee 19).

#### 4.2.4. Offerings

Digital agents could exert pressure on retailers to improve their serviceability, i.e. the quality of being able to provide satisfactory services to customers. It involves the customer’s ease of obtaining expected marketing offerings, the responsiveness of service personnel, and the reliability of service (Brucks, Zeithaml, & Naylor, 2000). According to one respondent, the responsiveness of service personnel varies among e-tailers:

“Some online stores provide good customer service. Their online service personnel are patient, polite, and the communication is customized. But the customer service of other online stores is ‘rubbish’, answering questions using automatic reply.” (Interviewee 25).

In the wake of the COVID-19 pandemic, some online retailers use a security logo or security slogan to safeguard service quality, which customers appreciate greatly in terms of serviceability and creates new standards and higher expectations:

“Some online stores present safety warranty, which shows that all products sold in this store have passed disinfection, sterilization, and safety inspection. This information is provided on the online store’s webpage. If there is no such security information, I will not consider buying because I feel worried.” (Interviewee 16).

Evidently, e-tailers can provide fresh food to customers on-demand and increase the product variety, which has been acknowledged:

“Online stores provide a wider range of products and more services than offline stores.” (Interviewee 9).

“The disadvantage of a supermarket is that vegetables and fruits are fresh only when they are first loaded on the shelf. After that, fresh ones will be picked out by the elderly who have more free time than us young people. Therefore, we purchase vegetables and fruits online. The products delivered are fresh.” (Interviewee 20).

Furthermore, digital channels have fueled the retailing industry to evolve toward the omnichannel retailing model (Verhoef et al., 2015), which helps retailers showcase the quality of products and enhance purchasing convenience:

“I buy food from Hemaxiansheng because it has both the offline store and the mobile app. I have tasted the food in the offline store. I like the flavor and consider them to be of good quality. Based on that experience, I do not need to search offline and can place an order directly online, which is very convenient and time-saving.” (Interviewee 6).

#### 4.3. Socio-economic adaptability during crises

Socio-economic adaptability reflects the flexibility and ability of all relevant stakeholders in a sector – individuals and organizations – to identify and capitalize on emerging market and technology opportunities to create and develop new structures, processes, and capabilities, to ultimately maintain or renew their strengths for the specific situations they face (Tuominen, Rajala, & Möller, 2004). Evidence from the interviews shows that consumers react to the sudden COVID-19 outbreak by changing their expectations, demands, and purchasing behaviors as a coping mechanism in the crisis. Furthermore, confronted with this unprecedented pandemic, many retailers have accelerated their digital transformation and embraced service innovations to meet consumers’ needs of convenience, timeliness, and safety in their purchasing activities.

##### 4.3.1. Structures

Some consumers prefer to use only one e-commerce app to serve all their purchasing needs, to save time and minimize delivery costs. This ‘one-stop shopping’ is considered to be convenient as it fulfils consumers’ needs efficiently. As noted in two instances:

“If an online platform allows me to buy all the things I need at one stop, I will use this platform frequently. I need to buy a certain amount to meet the conditions of free delivery.” (Interviewee 3);

“I place orders on the online platform with the most complete range of products I want to buy.” (Interviewee 8).

We also found that some consumers would search multiple e-tailers and choose to purchase from an e-tailer that has in stock the product they most need at the moment of placing the order:

“The most important factor for my purchase decision is whether the product is in stock. If I need flour in particular and I can find it on Taoxianda.com, I will buy all the other things I need there. If I buy at once, I can avoid multiple express deliveries. I can also help reduce pressure on transportation capacity.” (Interviewee 4).

The importance of resilient and effective logistics structures was mentioned by seventy-two percent of the interviewees. As the pivot that connects e-tailers with consumers, logistics is essential for online retailing. It is recognized as a main source of competitive advantage for the e-commerce industry (Gajewska & Zimon, 2018). Following the pandemic outbreak, e-tailers’ ability to deliver goods on time has become a determining factor in consumers’ purchase decisions:

“I pay attention to the delivery time before making a decision to purchase online. The delivery time is vital, especially for cooked food. For example, since I have to eat tonight, the food should be delivered to me today not tomorrow. For daily necessities, I will consider whether I need the goods soon, or I can wait until the transportation capacity is restored.” (Interviewee 3).

Resilience of logistics structures refers to the ability of the logistics system to return to a stable state following strong perturbation from the hit of the COVID-19 crisis. Evidently, the self-built logistics by e-tailers are crucial for them to outperform competitors. Two respondents suggested:

“There are notable differences in the logistics capacity between various e-commerce platforms during the pandemic. I think JD.com performs the best with its own logistics system. I hope Taobao.com will build its own logistics services as well.” (Interviewee 10);

“JD.com is easy to use during the epidemic. They have their own logistics. So, the delivery is timely. As long as the goods are available, they can be delivered the next day.” (Interviewee 21).

#### 4.3.2. Actors

During the COVID-19 crisis, online shopping has become a new habit for many consumers who never purchased online before. Our research indicates that this trend is likely to continue even after the epidemic crisis ends. This fundamental change in the shopping habits of former offline-only consumers may lead to an expansion of the online market:

*“The COVID-19 outbreak can be a turning point, with the number of online shoppers growing by leaps and bounds, because the epidemic has ‘forced’ people to use online shopping.”* (Interviewee 4);

*“Online consumption has spread to more middle-aged and elderly consumers during the pandemic. After the outbreak, my mother and my aunt started to buy products online, which they had never done before.”* (Interviewee 5);

*“I have installed the Taobao.com app and JD.com app in my parents’ mobile phones and taught them how to use these apps for shopping. They have tried and felt cool with online shopping. The overall experience is fun and exciting for them.”* (Interviewee 12).

Consumers demonstrate different behavioral tendencies when shopping online during the crisis. Some consumers perform proactive behaviors that involve behavioral initiatives aimed at improving current circumstances or creating new ones rather than just responding to a situation after it has happened.

*“I am thinking of selling local agricultural products through WeChat or other online platforms as a part-time job. Many of my friends are selling things online. They can provide good products and good service. Why can’t I do the same?”* (Interviewee 2);

*“I buy daily necessities on the e-commerce platform of China Merchants Bank. The most important reason is that this platform offers many shopping vouchers and I have lots of time to search vouchers on this platform during the pandemic.”* (Interviewee 20).

Some consumers adopt a reactive approach by acting in response to the situation caused by the COVID-19 pandemic:

*“Masks are sold out offline and there is no other way to buy them except online. So, I have to buy masks online where there is a variety of masks available for me to choose.”* (Interviewee 16).

Consumers also engage in impulsive buying, an unplanned purchase accompanied by rapid decision-making and subjective bias in favor of immediate possession (Japutra et al., 2019). Respondents reported that they experienced an urge to buy spontaneously and in panic:

*“During the pandemic, it is very easy for me to buy some things following others, such as frozen food and bottled water. In fact, these things are not urgently needed. But because of the panic caused by COVID-19, everyone is desperately buying goods online and stocking them up. In the coming months, I will continue to stock up on food and necessities.”* (Interviewee 3).

For some consumers, impulsive buying is not driven by panic but by an addiction to the shopping experience:

*“As we girls cannot shop in offline stores during the pandemic, we miss the feeling of shopping. I vent my shopping desire online, blindly buying things I do not really need, such as cosmetics.”* (Interviewee 27).

Situational factors such as sales promotions launched by e-tailers (an in-store factor) and time availability (a personal factor) could act as arousal for impulsive consumption (Badgaiyan, & Verma, 2015):

*“As I spend more time and energy browsing online products during the pandemic, I am more likely to buy on impulse and purchase items that are not really necessary.”* (Interviewee 31).

Nonetheless, the pandemic has also provided an opportunity for

consumers to reflect on their impulsive buying habits.

*“During the pandemic, I realized that my previous consumption habits have exceeded my real needs and were actually quite irrational. For example, I used to buy shoes and bags and throw them away after wearing or using only once or twice.”* (Interviewee 3);

*“My consumption has returned to meeting my basic survival needs during the pandemic. I become conscious of my habit of spending money blindly. This habit can be changed.”* (Interviewee 5).

Although respondents have generally increased the amount of money spent online during the pandemic, their frequency of purchasing online demonstrates different patterns. For example, consumers have increased the online purchase frequency for essential products, such as food and antiviral products (e.g., masks, disinfectants). Conversely, they have reduced the consumption of non-essential products:

*“I do not buy bags or shoes during the pandemic. The only piece of clothing I bought after the outbreak was a set of pajamas.”* (Interviewee 4);

*“I do not book hotels or buy tourist attraction tickets during the pandemic.”* (Interviewee 11);

*“I buy disinfectants, surgery masks, vegetables, and other necessities online. I will only buy cosmetics and bags when the pandemic is over.”* (Interviewee 16);

*“I purchase vegetables and fruits online often to keep them fresh. I do not buy jewelry or clothes during the pandemic because I do not need them.”* (Interviewee 24).

Special offers and promotion activities of e-tailers would encourage customers to buy more:

*“Every Tuesday is the Membership Day of Hemaxiansheng.com, when there is a 12% discount store wide. Therefore, I buy almost everything on Tuesday each week.”* (Interviewee 4);

*“I bought skin care products from a merchant on Taobao.com, which announced that the price has been reduced during the pandemic, and that products would be delivered by SF Express free of charge. If they did not offer these, I would not choose them.”* (Interviewee 24).

A number of consumers shop online less frequently for convenience purposes, such as to save time and to save on logistics resources:

*“Because the delivery time is longer and the delivery capacity is limited, I would store a bunch of things in the online shopping cart and buy them together.”* (Interviewee 5).

Consumers have also changed their frequency of online shopping because of safety reasons:

*“I only purchase what I badly need online during the pandemic because I am worried that the goods or the package might carry coronavirus.”* (Interviewee 7);

*“I purchase online more often because I avoid going to public spaces for the sake of safety.”* (Interviewee 35).

In addition, consumers will compare online and offline prices, as well as product prices of different e-tailers to decide where to purchase:

*“If the online price of a product is much higher than that of the same product in the physical store, I will not consider buying it online.”* (Interviewee 10);

*“I compare product prices between e-tailers but not with brick-and-mortar supermarkets. This is because even if products are sold at a lower price offline, it takes more effort to travel there, pay, and carry them home, which is time-consuming and laborious.”* (Interviewee 21).

#### 4.3.3. Institutions

Social commerce is growing, and customers actively participate in collaborative purchasing through online interaction by using Web 3.0 applications (Huang & Benyoucef, 2013). As discussed before, people who live in the same residential community utilize social networking sites to form online shopping communities where they share information and connect with each other to acquire products. This community-purchase model enables customers to obtain necessities without going out of their community residences during the pandemic period.

*“We use this WeChat group to purchase from the local grocery store. I pick up the products at the gate of the community. It reduces the risk of exposure to COVID-19 outside.”* (Interviewee 21);

*“I used this residential community WeChat group to buy seafood and found that the crabs were fresh, cheaper than the market, and delivered by appointment.”* (Interviewee 31).

As Dolata (2009) postulated, sectoral adaptability requires a fit between the new technological opportunities (e.g., e-tailing) and the institutional framework of a sector. Accordingly, customers expressed their expectations for governmental policies to establish and frequently check implementation of delivery standards to facilitate e-tailing and address the risks of COVID-19:

*“Thanks to the measures taken by the government during the pandemic, wearing face marks and sterilizing packages are mandatory for couriers in my city. I feel at ease when receiving my packages.”* (Interviewee 23);

*“Sterilization and antivirus measures are of utmost importance in the process of express delivery. I hope government authorities will ensure the hygiene and safety standards of logistics for e-commerce.”* (Interviewee 32).

Besides, sectoral adaptability is reflected in the openness and flexibility of actors to change their activities (Dolata, 2009). For example, physical stores locally have extended their online channels to increase their availability. In particular, small and medium sized local retailers, such as bakeries, cafes, and restaurants, have expanded their geographical scope of business by opening online stores on e-commerce platforms that offer food delivery service. Overall, these approaches have increased the availability of retailers in the digital environment:

*“I do not need to go to the supermarket to buy vegetables because this supermarket has an online store on Meituan.com and the price is reasonable. My favorite milk tea store has opened an online store on Eleme.com. I make the order online and Eleme.com will deliver it to me.”* (Interviewee 24).

#### 4.3.4. Processes

The adaptability of the retail sector can occur through the redefinition and readjustment of the retail processes, as per Dolata (2009). In the wake of the COVID-19 pandemic, e-tailers have modified their distribution procedures based on the guiding principles of hygiene and safety. For example, to meet consumers' expectation for enhanced product hygiene, several e-tailers have offered 'contactless delivery' services. Contactless delivery refers to couriers placing goods at designated locations e.g. the gate of community residences, thus reducing the possibility of coronavirus transmission and infection. Some respondents expressed their "satisfaction" with this change (Interviewee 27), whereas others complained that "Some retailers do not provide contactless delivery, so I have to communicate face-to-face with couriers." (Interviewee 16).

Catering enterprises have been providing a special 'takeaway information card' attached to the takeaway package. This little card indicates the name and the temperature of the chef, the packager, and the courier. Some of these cards even incorporate QR code technology. Upon scanning the QR code, the consumer can watch a short video about the

production and packaging process. By applying this change to the distribution process, catering enterprises seek to convey that their food production process is safe, reliable, and traceable. As commended by three respondents:

*“I use KFC Express delivery because they report the disinfection time. The signature of the person who carried out the disinfection and the body temperature of the courier are shown on a takeaway card. This makes me feel more at ease. A milk tea shop also provides similar cards, which surprised me. I trust this store even more. If I encounter an epidemic again in future, I will definitely choose this shop for milk tea, and I will advise friends to buy from this store.”* (Interviewee 28).

The purchases made by consumers online are location dependent. According to the respondents, this is partly due to safety reasons and partly because of the time it takes for the product to be delivered:

*“Since I live in South China, the goods sent from North China usually can reach me in three to four days. It may take more than a week for the goods to arrive during the pandemic. I cannot afford such a long time to wait.”* (Interviewee 15);

*“For safety reasons, I am averse to products transported over a long distance during the pandemic.”* (Interviewee 20);

*“Safety is my top consideration when shopping online during the COVID-19 pandemic. If products come from e-tailers located in Wuhan, I will not buy them.”* (Interviewee 24).

Customers also pay special attention to whether the refund and product return process is effortless when evaluating e-tailers' service quality. Respondents expressed their satisfaction or dissatisfaction with the e-tailer service based on their experience in returning a product and claiming a refund:

*“Once I found the vegetables I purchased from Hemaxiansheng.com were not fresh, I lodged a complaint on this online platform, who immediately replied that they would refund and apologized to me. The service is good.”* (Interviewee 2);

*“Some merchants on Taobao.com were unable to have the goods delivered to me because of logistics reasons during the pandemic. After I applied for a refund online, I had to wait for two to three days before they agree to my refund application. The refund process takes a long time.”* (Interviewee 29);

In addition, e-tailers who have established close collaboration with their suppliers are able to develop agile and responsive supply systems to better serve customers when confronted with the public health crisis. As collaborative dynamics are shaped by the respective actors, they lead to sectoral adaptability (Dolata, 2009). This integration with suppliers is especially important for fast evolving industries (Sabet et al., 2017), such as online retailing, where the pace of change is high due to constant innovations. As mentioned by a respondent:

*“Why is Hemaxiansheng.com able to provide fresh food every day? It is because they have built strong relationships with farmers and agricultural bases. Unlike other retailers that rely on upstream companies to produce and deliver goods, Hemaxiansheng.com provide orders for their suppliers to customize their farming activities.”* (Interviewee 4).

## 5. Discussion and Conclusions

This study explores the impact of digital technologies on Chinese individuals' consumption trends and their online purchasing behavior during the COVID-19 pandemic outbreak in 2020, based on the reporting of their perceptions, preferences, and shopping experiences. In doing so, it addresses research gaps in the previous literature (Akhtar et al., 2020; Ameen et al., 2020; Laato et al., 2020) by showing how

digital technologies have improved the crisis management capabilities of the retail ecosystem when confronted with an unprecedented pandemic situation. For example, consumers reported they were positively impressed by their experiences with AI applications in their exchanges with retailers; these applications have made product deliveries more convenient for them during the pandemic. The present study also reveals key changes on consumers' purchasing behavior patterns during the COVID-19 crisis due to the accelerated digital transformation of retail, such as enhanced engagement in online purchase, forming community groups to purchase online, and increased demand for product hygiene. The role of regional or national governmental policies is regarded as a cornerstone for safeguarding minimum levels of standards with respect to quality indicators of service deliveries and retail supply chain operations.

In addition, this paper responds to Acquila-Natale and Iglesias-Pradas' (2021) call for more research on consumers' online purchasing behaviors within a multichannel retailing context. Specifically, this paper sheds light on consumers' perceptions about the role of digital technologies in shaping their expectations and purchasing behaviors during the unprecedented and challenging COVID-19 pandemic, which is likely to stay for an undefined period of time (Merchant, 2020). Respondents mentioned they prioritized shopping groceries and necessities online and stopped buying any luxury items across any offline or online channel. This is somehow contradictory to retail-related published research referring to previous epidemics, where either offline or online sales of groceries were not essentially affected during SARS and MERS epidemics (Forster & Tang, 2005; Jung & Sung, 2017). This can be potentially explained by the fact that the COVID-19 pandemic initiated regional or even national lockdowns.

Three overarching dimensions signifying the retail ecosystem transformation during the COVID-19 pandemic lockdown in China were identified: triggers of enhanced digital engagement, transformative capacity of digital technologies, and socio-economic adaptability during crises. These dimensions emerged from consumers' perceptions and experiences with respect to the retailers' abilities and the wider ecosystem practices, as these have been reported in the in-depth interviews undertaken. In general, the interviewees believed that online retailing would become more widespread and popular across generations as influenced by the pandemic crisis, and they expected that retailers would further accelerate their digital transformation. They hoped that in this way e-tailers would improve their serviceability, enhance resilience, and adapt to the dynamic retail environment. This is in agreement with Ross (2015) and Khamis (2020) from both producers' and consumers' viewpoints who have exemplified the integration of all retail stakeholders' links by embodying the latest of system management and digital features in retail, according to a configurational business enterprise architecture. Overall, our research is in congruence with some of the research themes that have been recently conceptualized in other studies, such as the impact of COVID-19 on business, supply chains, services, and socio-technical transition (Verma & Gustafsson, 2020). The study findings advance the extant literature on consumer behavior and online retailing in times of crisis and offer important theoretical and practical implications.

### 5.1. Theoretical implications

The present study has sought to delve into the influence of digital technologies on individuals' online purchasing behaviors through the lens of a public health crisis. Previously, researchers have discussed consumer behaviors in crises (Ballantine et al., 2014; Delorme et al., 2004; Kennett-Hensel et al., 2012; Sneath et al., 2009), and the influence of ICTs on individuals' lives during crises (Baytiyeh, 2018; Shklovski et al., 2010). However, with few exceptions (e.g., Forster & Tang, 2005), rarely has any study combined these two research streams to uncover consumers' perceptions and experiences of the usage of digital technologies in shaping or changing their purchasing behavior amid a crisis;

even fewer studies have empirically investigated the use of digital technologies and online platforms during epidemic crises (Effenberger et al., 2020; Ivanov, 2020; Papadopoulos et al., 2020).

Our study has delineated a systematic mapping of the triggers and factors that influence the retail ecosystem's reactions to the COVID-19 shock. Two underpinning frameworks (i.e. Dolata, 2009; Hagberg et al., 2016) have provided the theoretical foundations for building a retail-sector focused conceptualization that encompasses the digital transformation of this sector under the unprecedented lockdown conditions imposed due to the COVID-19 pandemic. Alongside the theoretical underpinnings, consumers' responses to the semi-structured in-depth interview questions were also gathered, which revealed that all retail stakeholders try to respond to the impact of the epidemic crisis effectively through usage of sophisticated digital applications. This opens new horizons for an array of follow-up research, not only on consumer behavior in the crisis and the impact of digital technology, but also on retailers' capacity for managing crises.

The framework proposed in the current study (Fig. 3) identifies a series of underlying themes and adds theoretical value to the existing literature of online purchasing behaviors and the relationships among digital technology, consumers, and e-tailers in the retail ecosystem, while people live under lockdown circumstances. Hence, it constitutes an analytical agenda for empirically explaining the technology-based changes in the retailing sector during a severe epidemic crisis. Our framework substantiates Dolata (2009), who highlights the importance of the transformative capacity of new technologies in affecting socio-economic sectoral changes. It also echoes the work of Hagberg et al. (2016) by combining the transformative capacity of digital technologies with the socio-economic adaptability of structures, actors, institutions, and processes to adapt and absorb technological innovations in the retailing sector, when confronted with technological opportunities and challenges posed by the crisis. In this vein, a proposition may be extracted to serve for further research:

*P1: Retail stakeholders benefit from the power of digital technologies by seeking to match systems and offerings with the changing reality of consumers' needs and socio-economic structures during the pandemic crisis.*

As our study indicates, consumers increase their digital engagement because of the unprecedented situation caused by the epidemic crisis, which comprises challenges from the external environment, unavailability of resources, and changes in individuals' psychology such as fear and anxiety. This offers empirical support to Finsterwalder and Kuppelwieser (2020) who signified the psychological, physical, and social challenges as key factors that drive individuals' interest to preserve their wellbeing during the COVID-19 pandemic crisis.

Moreover, as digital technologies allow consumers to overcome geographic boundaries and offer an alternative channel for people to obtain limited resources, recuperate convenience, and establish a new norm of life in the crisis, consumers have developed a growing reliance on ICTs and mobile devices in particular. As Tai and Sun (2007) pointed out, the Internet functioned as a catalyst to empowering consumers' communications during the SARS epidemic in China. Besides, in the same publication, scholars highlighted that 'new online applications are being invented or reinvented constantly' (Tai & Sun, 2007; p. 1005); they also projected structural transformations would be formed in the future among consumers and other stakeholders, including media platforms and the government. This is in line with Forster and Tang (2005) who found that consumers increased online shopping to acquire products normally purchased in traditional supermarkets during the 2002-2004 SARS crisis. This is also consistent with Priporas et al. (2017) who found that shoppers have become increasingly technology-dependent, and use the digital platforms and devices extensively to fulfill their individual needs and wants (Magsamen-Conrad & Dillon, 2020; Zhu, 2021). A comparison between Forster and Tang's (2005) study and ours, shows that the role of online shopping was quite limited during the SARS epidemic compared to the COVID-19 epidemic in China; this is due to the different circumstances and nature

of these two health crises, the technological advancement in the last decade, as well as the increasing adaptability of the retail stakeholders to a changing socio-technical environment. Furthermore, during the MERS epidemic outbreak which occurred between the SARS and COVID-19 ones, a tendency for more online and less offline shopping during health crises has been demonstrated, with certain variations on consumers' channel preferences depending on the categories of retail goods and the characteristics of the corresponding markets (Jung & Sung, 2017). In line with this discussion, the following propositions may support future research investigations:

*P2: Consumers try to create a new retail purchasing normality, as an innovative response to the crisis by discovering and allocating available digital technology resources, as well as changing ways of purchasing goods to the real-time needs while in lockdowns.*

*P3: Consumers tend to increase their online purchasing due to the pressure felt from the unprecedented situation caused by the COVID-19 pandemic and the lockdowns, aiming at maintaining a certain level of individual well-being.*

Also, interestingly, whereas all interviewees conveyed their optimism about the future of online retailing – partly propelled by the unprecedented challenges faced during the COVID-19 lockdown – and commented that online retailing suits the fast pace of life in modern cities, yet quite a few of them explicitly expressed their concerns about potential negative consequences of purchasing online (e.g. Kuppelwieser & Finsterwalder, 2016). First, they are worried that they will be more likely to engage in impulsive buying and order things they do not actually need because they have more time to search online and/or sales promotions are attractive (Jung & Sung, 2017). These situational factors could increase one's urge to buy impulsively as shown by Badgaiyan and Verma (2015). Secondly, some respondents expect to shop offline when the pandemic is over to gain in-store experiences (e.g., Interviewee 22, Interviewee 31). This is because they desire to experience the store environment, interact with employees, and smell, touch, and even try the products on spot. Besides, this is implied in the work of Yoon and Park (2018) who underlined the in-store shopping experience as a significant predictor of customer loyalty toward a retailer. Thirdly, interviewees are afraid that too much of online shopping is not conducive to establishing or strengthening social bonds. They feel that compared with online shopping, offline shopping could facilitate meaningful social interactions and the exchange of feelings between family members or friends. This is consistent with the extant literature (Harwood & Eaves, 2020; Jiang & Balaji, 2021) on the dark side of technology. Considering these, we call for further works to examine empirically the potential off-putting or unattractive elements of online shopping and offer managerial implications to assist consumers, retailers, and the society to tackle the pertinent challenges:

*P4: As consumers acknowledge the decisive role digital technologies play in helping them overcome the repercussions of the COVID-19 pandemic while in lockdown, they realize that a balance in utilizing digital applications needs to be sought to avoid any negative effects to their purchasing behavior.*

In addition, we found that spatial and temporal aspects could explain variations in consumption patterns during the COVID-19 pandemic crisis. This signifies shifts in consumer preferences regarding the locations of actual purchase and deliveries (spatial), and the times the retail processes are expected to occur (temporal), i.e. timely deliveries and real-time updates during lockdowns. These findings corroborate Hall et al. (2017) who noted that two patterns are important in this respect: first, managing the retail processes optimally and safely in a turbulent environment; and second, communicating with consumers aptly while handling their queries or complaints. Our study extends this line of thinking by showing that both initiatives can be supported by capitalizing on the transformative capacity of digital technologies, and understanding the forces that advance the socioeconomic adaptability of digitalized retail systems.

## 5.2. Practical implications

The findings of this study have several practical implications. First, this study may help various retail ecosystem actors to identify the factors that have triggered changes in individuals' engagement with online consumption during the COVID-19 crisis, and allows retailers to tailor their services and marketing offerings toward the changing consumer behaviors during crises. The empirical evidence presented here should assist retailers in better understanding the psychological and behavioral shifts of consumers during a public health crisis and provide retailers with insights into consumers' digital engagement, their needs, and expectations when shopping online. This would enable retailers to adapt to the changed attitudes and habits of consumers in the crisis through adaptive positioning, in order to suit consumers' expectations on the various phases of retail processes, their sentiments, and the largely altered retail ecosystem.

It is evident from the findings that the COVID-19 outbreak has been a catalyst for the digital transformation of retailers. As indicated by the findings as well as prior literature, digital innovation in retail operations is imperative (Reinartz et al., 2019). This situation calls retailers to budget over investments in digital innovations (e.g., AI applications), and leverage them to offer enhanced value for consumers, through timely and safe deliveries, real-time information and secure online transactions. In addition, retailers should recognize the growing need of consumers for Web 3.0 applications to support cheaper, faster, and safer exchange services. As such, retailers should consider using the findings of this study to foster a stronger collaboration with professionals in the technological sector, in order to improve consumers' purchasing experiences. Furthermore, this study provides new insights for retailers to adjust to new business models, such as the emerging community group-purchasing model indicated by several interviewees, which would contribute to an enhanced Marketing 4.0 mix of serving needs and monitoring online interactions and emotional states real-time (Lu et al., 2010).

Equally important, our findings emphasize the necessity of retailers to improve their socio-economic adaptability during a crisis. In the current study, concerns were raised by interviewees about the serviceability and accountability of e-tailers in customer service. Interviewees expressed their hope for e-tailers to be more responsive in online communications, offer convenience, ensure timeliness in delivery, and guarantee product hygiene, as their expectations have been significantly raised with regard to those retail service features during the lockdowns. Thus, interviewees' suggestions about establishing resilient and agile logistics structures in supply chain management via the adoption of digital innovations may be of great value to e-tailing; This could further enhance the competitive advantage of e-tailers. According to examples of successful e-tailers shared by interviewees, the self-operated logistics model could be useful in ensuring the effectiveness and efficiency of logistics services during crises, as e-tailers can better control logistics services compared to others that rely on third-party logistics. Additionally, the findings of this study shed light on the consumers' expectations for governmental authorities to support the development of e-commerce by establishing and regularly scrutinizing enactments of delivery standards to address the risks of future pandemic outbreaks.

## 6. Limitations and suggestions for future research

As with any study, this one also has certain limitations. First, due to its qualitative nature and the abductive approach followed to build theory, the generalizability of the results is limited. Thus, it would be worthwhile for future researchers to conduct quantitative research to further substantiate the study findings and to validate the conceptual model developed here. Second, this study was conducted in China during the COVID-19 pandemic period. Future works could investigate consumption behaviors in different countries affected by the same or other types of epidemic crises to verify whether the patterns revealed in

this study would work in diverse settings. Furthermore, it would be interesting to perform a comparison study between consumers from Eastern and Western cultures to identify differences in the factors that prompt online purchasing behaviors and shape the retail ecosystem during an epidemic or other major crises that may also be accompanied by lockdowns. In this respect, it would also be interesting to conduct longitudinal studies that would aim to confirm the participants' insights regarding the long-term effects emerging from the large-scale but short-term engagement of consumers with e-tailing during the lockdowns.

**CRedit authorship contribution statement**

**Yangyang Jiang:** Conceptualization, Data curation, Investigation, Project administration, Writing – original draft, Writing – review & editing, Methodology, Visualization. **Nikolaos Stylos:** Conceptualization, Formal analysis, Investigation, Methodology, Project administration, Software, Writing – original draft, Writing – review & editing.

**Appendix A. Semi-structured interview guide (Ang et al., 2000; Baytiyeh, 2018; Kennett-Hensel et al., 2012; Priporas et al., 2017)**

	Interview question	Literature source	Research context
1.	Please explain how you have been affected during the ongoing COVID-19 pandemic crisis.	Kennett-Hensel et al. (2012)	Examines the consumption attitudes and buying behavior of Hurricane Katrina victims.
2. a.	How have the digital technology, applications, and online platforms helped you since the COVID-19 outbreak? Please explain.	Baytiyeh (2018)	Investigates the usage of mobile technologies in the aftermath of terrorist attacks among low socioeconomic populations.
2. b.	What digital media and apps have you been using, and have you started using any new devices or/and apps during the crisis period?	Priporas et al. (2017)	Explores Gen Z consumers' perceptions, expectations and recommendations in terms of their future interactions in the smart retailing context.
3.	What types of products have you been purchasing through a) offline stores, b) online platforms/e-tailers during COVID-19 crisis?	Kennett-Hensel et al. (2012)	Examines the consumption attitudes and buying behavior of Hurricane Katrina victims.
4.	Have you increased purchases through online platforms/e-tailers since the COVID-19 outbreak, in terms of frequency and value of purchases?	Ang et al. (2000)	Analyzes the reactions and adjustments of Asian consumers and businesses during the economic crisis.
5.	What aspects are important to you in your decision to make a purchase from an online platform/e-tailer during COVID-19 crisis?		
6.	What things would lead you to decide NOT to make a purchase through a particular site/online platform during COVID-19 crisis?		
7.	What kinds of products would you NOT consider purchasing from e-tailers in this pandemic crisis, and why?		
8.	What would you have liked (or expected) e-tailers to have done differently during this pandemic crisis?	Priporas et al. (2017)	Explores Gen Z consumers' perceptions, expectations and recommendations in terms of their future interactions in the smart retailing context.
9.	Do you have any additional comments or observations to make that would be relevant to your online shopping as this has been experienced during the COVID-19 crisis?		
10.	How do you believe your shopping behavior has changed or could possibly change in the future resulting from your interaction with e-tailers and products during the COVID-19 crisis?		
11.	How do you see the present and future of online retailing, and how do you envision its role and influence on consumers?		

**Appendix B**

Phase One – content analysis: Manual open coding according to Dolata (2009) and Hagberg et al. (2016).

Technological framework	Retail ecosystem interface	External factors / triggers	Transformative capacity of new technologies	Socioeconomic adaptability
Settings		Prevention/Control Limit orders Restricted, isolation Psychological fluctuations Stopped ordering takeaways Travelling affected Routines changed Work and consume at home Afraid of queues in supermarkets	Online platforms as alternative to offline stores Inclined to move toward a 100% online shopping Package disinfection Sterilization & enhanced packaging	One app for all More than one e-tailers to serve needs Local suppliers, not from far (and not from COVID affected areas)
Actors		E-tailers Couriers New apps & platforms	Reliable vendors & platforms HEMA, DingDong, JD, applications Customer accountability WeChat merchants	Purchase frequency No bundles of fresh products Personalized shopping experiences
Exchanges		Information apps Save time and energy	Express delivery Response time	Group/community purchasing, WeChat Easy returns

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(continued)

Technological framework Retail ecosystem interface	External factors / triggers	Transformative capacity of new technologies	Socioeconomic adaptability
	New habits developed Logistics affected by volumes, orders, stocks Prices increase Risk of packages to be stolen Seldom visit malls Impulsive consumption	Real-time service Convenience Security Place multiple orders to secure delivery Easy comparisons between platforms Great logistics made the difference, no third party Notify recipients via item photographing 5G to enhance comms Drone distribution	Build relations: merchants & customers Contactless deliveries Incentives: free delivery, coupons, sales Door-2-Door delivery Safety comes first
Offerings	Often low quality of agricultural products purchased online No public transportation No events	Pricing not major Price protection Customer experience Improve variety Increase capacity Security logo and slogan on offerings More fresh groceries online	Masks, hygiene products online Packaged food online Take-out only at community gates Take-out info cards

Appendix C

Tree map NVivo.



Appendix D

Phase Two – NVivo coding frame.

Keywords for Settings	Keywords for Actors	Keywords for Exchanges	Keywords for Offerings
Online	Retailers	Shopping	Products
Epidemic	Platform	Use	Goods
Crisis	Taobao	Make	Things
Offline	Apps	Purchase	Vegetables
Coronavirus	Supermarket	Delivery	Necessities
Time	Consumers	Bought	clothes
Future	WeChat	Express	masks
Outbreak	Seller	Convenient	Food
Home	e-shop	Order	Quality
Digital	Community	Logistics	Fresh
Daily	Hema	Resilient supplies	
Disinfection	Store	Price	
Site	Customers	Speed	
Period	Group		
Life	Applications		

Appendix E

Extraction of Themes (nodes) based on combined manual and computer-assisted keywords.

External factors / triggers	Transformative capacity of new technologies	Socioeconomic adaptability
<p><u>Environmental changes &amp; challenges</u></p> <p>Prevention/Control outbreak                      Travelling heavily affected                      Inconvenience                      Impulsive consumption                      Seldom visit malls                      Lockdowns                      Work and consume at home during epidemic</p>	<p><u>Systems</u></p> <p>Online platforms as alternative to offline stores                      Package disinfection                      Sterilization &amp; enhanced packaging                      5G to enhance communications                      Drone distribution</p>	<p><u>Structures</u></p> <p>One app for all                      More than one e-tailers to serve needs                      Local suppliers, not from far (and not from COVID affected areas)                      Resilient supply chains</p>
<p><u>Changes in Individual psychology</u></p> <p>Impulsive consumption                      Psychological fluctuations                      Anxiety, bad mood, depression, fear, feeling isolated                      Afraid of queues in supermarkets                      Limited/Stopped ordering takeaways                      Routines/habits changed</p>	<p><u>Actors</u></p> <p>Reliable vendors &amp; platforms                      HEMA, DingDong, JD, Taobao apps                      Avoid false expectations/difficult to keep promises                      Customer accountability                      WeChat merchants                      e-shops</p>	<p><u>Actors</u></p> <p>Engagement with other consumers in new online collaborative activities                      Incentives: free delivery, coupons, sales                      Purchase frequency depending on various parameters                      No bundles of fresh products                      Safety comes first</p>
<p><u>Changes in Personal Communications</u></p> <p>More functions in existing software                      Higher smartphone usage                      PCs still very important, but less PC usage compared to smartphones                      New mobile apps &amp; platforms</p>	<p><u>Exchanges</u></p> <p>Express delivery                      Response time                      Real-time service                      Convenience                      Security                      Risk of packages to be stolen                      Had to place multiple orders to secure delivery                      Easy comparisons between platforms                      Collaborative purchasing app (e.g. Wechat)                      Great logistics made the difference, no third party                      Notify recipients via item photographing                      Inclined to move toward a 100% online shopping</p>	<p><u>Institutions</u></p> <p>Group/community purchasing, WeChat                      Build relations: merchants &amp; customers                      Contactless deliveries                      The availability of physical stores has been key in shaping new forms of relations among stakeholders                      Governmental role in checking delivery standards</p>
<p><u>Unavailability of resources</u></p> <p>No public transportation                      No (or low) income                      Lack of agricultural products in the markets                      Food costs increased                      Logistics affected by volumes, orders, stocks</p>	<p><u>Offerings</u></p> <p>Price protection                      Improve variety                      Increase capacity                      Security logo and slogan on offerings                      More fresh groceries online                      Masks, hygiene products online                      Packaged food online</p>	<p><u>Processes</u></p> <p>Online buying necessities                      Take-out only at community gates                      Take-out info cards                      Easy returns</p>

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Dr. Yangyang Jiang is an Associate Professor of Marketing at Nottingham University Business School China, University of Nottingham Ningbo China, and Fellow of the Higher Education Academy. Research interests include services marketing, customer experience, and sustainable development. Her research work has been published in *Journal of Travel Research, Journal of Business Research, International Journal of Hospitality Management, International Journal of Contemporary Hospitality Management, and Journal of Hospitality Marketing and Management* among others. Dr. Jiang serves on the Editorial Advisory/Review Board of leading academic journals and is an ad-hoc reviewer for several highly-ranked journals and reputable academic conferences.

Dr. Nikolaos Stylos, SFHEA is Senior Lecturer/Associate Professor of Marketing, Post-graduate Research Director, and 'Innovation & Digitalisation' Lead at School of Management, University of Bristol, UK, and Honorary Professor of Hospitality Management, TUT, Taiwan. His research focuses on decision-making in services marketing and tourism with new technologies, and sustainability. He published in journals including *Technological Forecasting and Social Change, Computers in Human Behavior, Tourism Management, Journal of Travel Research, Psychology & Marketing, Journal of Business Research, International Journal of Contemporary Hospitality Management, Journal of Cleaner Production*. Dr Stylos served as professional management and technical consultant for more than a decade.